ABSTRACT

The logging tool of this invention includes a transmitter conveyed on a drilling
collar for exciting a quadrupole signal in a borehole being drilled by a drill bit and a
receiver for receiving the signal. The transmitter is operated at a frequency below the cut-
off frequency of the quadrupole collar mode. The received signal consists primarily of
the formation quadrupole mode which, at low frequencies, has a velocity that approaches
the formation shear velocity. The transmitter, in one embodiment, consists of eight
equal sectors of a piezoelectric cylinder mounted on the rim of the drilling collar. The
value of the cut-off frequency is primarily dependent on the thickness of the drilling
collar. Alternatively, the transmitter may be operated to produce both the collar mode
and the formation mode and a processor may be used to filter out the collar mode.